PERFORMANCE MEASUREMENT IN DEFENCE R&D CANADA

by

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**Director R&D Program Oversight*
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EXECUTIVE SUMMARY

The Directorate of R&D Program Oversight was created in August 1998 and tasked to develop a strategy and processes for:

(a) measuring the performance of the Defence R&D Branch in program delivery, and
(b) assessing program effectiveness.

This paper describes the system that has evolved, beginning with the performance measurement framework in which the oversight system must operate. This includes: Vision, Mission, Values, Strategic Objectives, Key Objectives, Business Plans, Business Activities, Outputs, and Impact. The linkage of DRDC's performance measurement framework to DND's Defence Strategy 2020 is noted.

Next, the paper provides considerable detail on measuring performance and preparing an annual performance report. The performance measurement concept is structured around the above-noted Key Objectives and DRDC's four Business Lines:

(1) R&D for the Canadian Forces and National Defence
(2) Strategic S&T Policy and Advice
(3) S&T with National Security Partners
(4) Corporate Management

The principal focus is on (1), our main Business Line. Performance metrics include: success rate on Major Initiatives and milestones, resource expenditures, and client satisfaction.

For the purposes of assessing scientific quality, the approach is to:

- Track indicators which are a reflection of the Agency's standing in the scientific community.
- Conduct a peer review of each Defence Technology Area periodically, probably every four years.

Ideas are offered re metrics and reports that could be provided to management periodically during the fiscal year, such as:

- Monthly report on key financial metrics (i.e. current practice).
- Status report on Key Objectives, Client Group Major Initiatives, milestone delivery and staff utilization at the end of the second, third and fourth quarters of the fiscal year.

DND is in the formative stages of developing a departmental performance measurement system, and the paper notes how DRDC's system will mesh with DND's.

Finally, the level of effort required to operate the program oversight system is examined. The fundamental principle is to seek only such data and information from the Defence Research Establishments and headquarters Directorates as should be on hand anyway for the purposes of sound, accountable, results-oriented management. Consequently, the demands placed on these responsibility centres are modest.

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1 INTRODUCTION

The Directorate of R&D Program Oversight (DRDPO) was created in August 1998 and tasked to develop a strategy and processes for:

(a) measuring the performance of the Defence R&D Branch (DRDB) in program delivery, and
(b) assessing program effectiveness.

In November 1998, DRDPO produced a discussion paper which provided a framework for program oversight, as well as some detail on ways to measure performance, and made a presentation on these concepts to the R&D Executive Committee (RDEC). In February 1999, DRDPO again briefed RDEC and received approval-in-principle for both the framework and the measurement system. In May 1999, the concept paper was completed (Reference 1). The next major task was to prepare an Annual Report for DRDB covering fiscal year 1998/99. This was completed in the fall of 1999 (Reference 2) and received much favorable comment from clients, staff and stakeholders.

In the same time frame as this Program Oversight activity, the Alternative Services Delivery Review of DRDB was forging ahead. The Development Phase ended in July 1999 with the decision to convert DRDB to a Special Operating Agency (SOA) and Level 1 organization in DND. The Implementation Phase then commenced, culminating in Agency stand-up on 1 April 2000, with the new name of Defence R&D Canada (DRDC). On 27 July 2000, Treasury Board Ministers approved DND's submission to make DRDC an SOA.

A performance measurement system is mandatory for SOAs, and it is instructive to take note of the following pertinent sections of DRDC's Framework Document (Reference 3).

Performance Measurement

The Chief Executive Officer (CEO) is responsible for ensuring that a performance measurement system is implemented that will provide DRDC management with the information necessary to make decisions affecting the business of the Agency and that will enable the CEO to report to the Deputy Minister (DM), the DRDC Management Advisory Board and clients on the Agency's performance. Performance indicators will be published in the Business Plan and annual report.

Evaluation

The DM is responsible for ensuring that formal evaluations of DRDC are carried out from time to time

Audit

The Chief of Review Services shall periodically.

- audit the financial statements of the Agency,
- assess the fairness and reliability of the information about the Agency's performance given in the annual report;

- report on the above to the DM

Since the publication of Reference 1, the Oversight Directorate has gained more than a year of valuable experience in performance measurement. Most of the ideas in Reference 1 have proved viable and useful, but a few (notably the use of Critical Success Factors) did not seem worth pursuing after more careful examination. At the same time, DND has made progress in outlining its framework and requirements for performance measurement, and DRDC has been able to identify how its oversight process will mesh with DND's. Consequently, it is timely to write a paper which will supersede Reference 1 and which will provide guidance for program oversight in DRDC for the next several years.

This paper, therefore, describes the performance measurement system that has evolved, beginning with the performance measurement framework in which the oversight system must operate. The linkage of DRDC's performance measurement framework to DND's strategic objectives is noted. Next, the paper provides considerable detail on measuring performance and preparing an annual performance report. Ideas are offered re metrics and reports that could be provided to management periodically during the fiscal year. The paper notes how DRDC's oversight system will mesh with DND's. Finally, the level of effort required to operate the program oversight system is examined.

II PERFORMANCE MEASUREMENT FRAMEWORK

DRDC's performance measurement framework may be summarized in bullet form as follows.

- ***Vision – Mission – Values***
- ***Strategic Objectives***
- ***Key Objectives***
- ***Business Plans***
- ***Business Activities***
- ***Outputs***
- ***Impact***

Let us now consider each of these bullets.

II.1 Vision – Mission – Values

Our Framework Document provides the most up-to-date statement of our Vision and Mission. It is worthwhile to list them here.

Vision
As Canada's lead defence science and technology organization, the vision of Defence R&D Canada is to provide science and technology leadership to the Department, the Canadian Forces and the Canadian defence industrial base into and through the 21st century

Mission
As the national authority for providing S&T leadership in the advancement and maintenance of Canada's defence capabilities, the mission of Defence R&D Canada is to

- Facilitate and enhance the ability of decision makers to make informed decisions on defence policy, force generation, and procurement by providing expert S&T knowledge,
- Contribute to the success of military operations by pursuing R&D activities that provide improved support, knowledge, protection, and response to potential threats,
- Enhance the preparedness of the Canadian Forces by assessing technology trends, threats and opportunities, and by exploiting emerging technologies,
- Contribute to the creation and maintenance of a Canadian defence S&T industrial capability that is internationally competitive, by contracting to industry, by transferring technology to industry and by entering into partnerships in which cost and risk are shared, and
- Conduct S&T projects for clients external to DND, in order to assist the Agency in developing and maintaining its defence-related technological capabilities

Our Values Statement is under review as a result of the work of the Cultural Change Working Group in early 2000. The following statement is taken from the September1999 issue of *Looking Forward Staying Ahead* (Reference 4).

- Scientific integrity and professional responsibility are integral parts of our corporate culture. We are committed to maintaining these attributes and demonstrating them in all our R&D activities
- As part of the Defence Team, we are dedicated to providing responsive, efficient and cost-effective services
- We are committed to developing the skills and expertise of our employees, enhancing their well-being, and building a workforce dedicated to competence and excellence

II.2 Strategic Objectives

In the Framework Document, it was necessary to show a progression from DND's strategy to DRDC's strategic objectives, and to indicate as well the key results and outcomes arising from DRDC's activities and how they would be measured. This was addressed by beginning with *Defence Strategy 2020* (Reference 5), which DND published in 1999 and which articulates DND's long-term objectives and short-term targets for the future. Eight Change Objectives – the essence of Strategy 2020 – will guide and direct defence planning and investments into the next century. These eight objectives are as follows:

1. **Innovative Path** – Create an adaptive, innovative and relevant path into the future.

2. **Decisive Leaders** – Develop and sustain a leadership climate that encourages initiative, decisiveness and trust while improving our leaders' abilities to lead and manage effectively.

3. **Modernize** – Field a viable and affordable force structure trained and equipped to generate advanced combat capabilities that target leading edge doctrine and technologies relevant to the battlespace of the 21st century.

4. **Globally Deployable** – Enhance the combat preparedness, global deployability and sustainability of our maritime, land and air forces.

5. **Interoperable** – Strengthen our military to military relationships with our principal allies ensuring interoperable forces, doctrine and C4I (command, control, communications, computers, and intelligence).

6. **Career of Choice** – Position Defence as a rewarding, flexible and progressive workplace that builds professional teams of innovative and highly skilled men and women dedicated to accomplishing the mission.

7. **Strategic Partnerships** – Establish clear, strategic, external partnerships to better position Defence to achieve national objectives.

8. **Resource Stewardship** – Adopt a comprehensive approach to planning, management and comptollership, focused on operational requirements, that prepares us to respond rapidly and effectively to change.

DRDC's strategic objectives can be mapped into these Change Objectives as shown in the table on the next page. The first set of strategic objectives consists of the ten Outcomes at which DRDC's Technology Investment Strategy (Reference 6) is targeted; they respond to three of Strategy 2020's objectives: Modernize, Globally Deployable and Interoperable. The next strategic objective responds to DND's commitments in human resources (Career of Choice). As to the next DND objective, Strategic Partnerships, DRDC has set aggressive targets for increases in both national and international collaboration. Finally, on Resource Stewardship, DRDC aims to increase efficiency and cost-effectiveness, and ADM(S&T) has made quantitative commitments to this end to the Department.

Also indicated in the table are the Key Results and Outcomes that will demonstrate that DRDC is achieving its strategic objectives, as well as the Measurement Strategy for obtaining the necessary data and information. Thus, this table summarizes DRDC's performance measurement approach in a convenient one-page format.

Defence Strategy 2020	DRDC Strategic Objectives	Key Results / Outcomes	Measurement Strategy
Modernize **Globally Deployable** **Inter-operable**	1 Deployable covert, stealthy sensor systems with adaptable resolution and wide area coverage. 2. Rapid and reliable automated detection, identification, tracking and engagement of stealthy targets 3 Smart information, knowledge management and timely delivery for reliable and simplified decision-making in a complex environment 4 Robust, survivable and covert sensor and weapon systems for the 2020 warfighting environment 5. Timely and accurate assessment of asymmetric threats (e g Chemical and Biological, Information Operations) and effective countermeasures 6 Re-configurable simulation systems for training of individuals and teams, mission rehearsal and acquisition. 7 Individual and collective protection, survivability and sustainability 8 Rapid technology development, assessment and insertion (right systems available at the right time at the right cost). 9 Lethality matched to mission-wide range of potential weapons effects. 10 Adaptable operator tailored systems	S&T initiatives and products adopted for implementat-ion by the CF Technology Demonstration Projects Intellectual Property Technology transfer	Milestones and deliverables achieved Client Satisfaction Surveys Scientific Indicators Peer Reviews
Career of Choice	Motivated, qualified, productive, innovative, entrepreneurial and flexible workforce with shared core values and goals for the fulfillment of the mission.	Recognition as a first class employer	Staff surveys Absenteeism and turnover statistics
Strategic Partner-ships	Increased participation with national partners in cost-shared collaborative projects Increased internationally leveraged R&D	Joint projects Technology transfer Leveraged R&D Revenue generation	Leveraging $ Revenue $ Licenses and agreements
Resource Steward-ship	Comprehensive approach to planning, management and comptollership, focused on operational requirements, that prepares us to respond rapidly and effectively to change	Optimal utilization of resources Cost-effective and efficient organization	Track resource utilization (both financial & human)

II.3 Key Objectives

These are specific targets set annually by ADM(S&T) and published each fall in *Looking Forward Staying Ahead*. For example, the September 1999 issue had the following five Key Objectives for 1999/2000.

1. *In partnership with the strategic planning element of the Department, to develop a Canadian position on the Revolution in Military Affairs.*
2. *To have at least 10 S&T initiatives/products developed by the Branch adopted for implementation by the CF.*
3. *To develop a Technology Investment Strategy that responds to the needs of the Department and the CF in 2020.*
4. *To initiate at least five new Technology Demonstrator projects.*
5. *To establish a business development strategy that maximizes the benefits of defence R&D. Targets for 1999/2000 are to leverage $26M from external partners and generate $3M in income from external sources.*

II.4 Business Plans

DRDC delivers services along four Business Lines (Reference 3):

(1) R&D for the CF and National Defence
The majority of the Agency's resources will be directed to this Business Line where most of its R&D activities will take place. Activities within this Business Line are defined annually by Service Level Agreements (SLAs) with each of the Agency's major CF Client Groups.

(2) Strategic S&T Policy and Advice
This Business Line includes the strategic studies, advice and input to policy that the Agency provides to senior decision-makers in the Department and the CF on S&T issues. It also includes research in support of scientific and technical intelligence, technology watch/outreach activities and technology investment strategy.

(3) S&T with National Security Partners
This Business Line enables the Agency to exploit its S&T base to serve the needs of clients outside DND, including Canadian industry and other government departments. Also under this Business Line, the Agency may conduct projects for DND clients not covered by Business Lines 1 and 2. Under Business Line 3, the Agency collects and retains revenues to assist the development and maintainenance of its technological capabilities.

(4) Corporate Management
This Business Line includes central administration, infrastructure, human resources and management overhead. It also includes business planning, notably the formulation of the R&D programs for the Agency's major CF Client Groups, as well as management and co-ordination of international activities.

Our planning system is well developed for Business Lines 1 and 2. The programs are "packaged" into R&D Thrusts (currently 25 in Business Line 1 and 3 in Business Line 2) with resources, schedules, milestones and deliverables described down to project level. Business Line 3 consists of client-funded projects, for which planning must be done to the customer's satisfaction. Our planning for Business Line 4 is not as good as for Business Line 1, but it is improving rapidly.

In addition, ADM(S&T) must submit annually a Level 1 Business Plan to the DM and Chief of Defence Staff. This is a high level document in a DND-specified format.

II.5 Business Activities

Under Business Lines 1 to 3, DRDC undertakes R&D projects and tasks, and also provides expert advice, in response to clients' requirements. The nature of our management system, notably the SLAs and the Collaborative Planning and Management Environment (CPME), facilitates monitoring and tracking of activities under these three Business Lines. Under Business Line 4, activities are undertaken to support the programs of Business Lines 1 to 3.

As noted earlier, the majority of the Agency's resources are directed to Business Line 1. It is instructive to note that the elements of this Business Line include: Technology Investigation projects, Technology Application projects, the Technology Demonstration Program, the Technology Investment Fund, the Defence Industrial Research Program, the DND/NSERC Research Program, and the Defence Communications Program. These are defined in Annex A.

II.6 Outputs

Our focus here is on the S&T "products" resulting from our activities under Business Lines 1 to 3. These may take many forms, such as: reports or papers documenting knowledge, know-how, trials, experiments, studies, etc; technology demonstrators; software; advice delivered through letters, reports and briefings; and so on.

II.7 Impact

Impact measures are aimed at assessing the benefits that accrue from the outputs of DRDC's activities. We are primarily concerned with the benefits to DND and the CF, but our contributions to the generation of wealth and knowledge in Canada are also important. In the latter context, we must take special care to record instances of technology transfer from DRDC to Canadian industry, and to assess the impact of such transfers. The primary tool for assessing our impact on the CF/DND is a Client Satisfaction Survey, such as the one we conducted in 1999 (Reference 7). In this survey, we obtained views as to the impact of the R&D Program on DND and the CF, e.g. on decision-making, operational capability, Life Cycle Management, and reduction of PO&M costs. In 2000/01, we are conducting a survey and interviews to assess our impact on industry.

III PERFORMANCE MEASURES

The performance measurement concept is structured around the above-noted Key Objectives and DRDC's four Business Lines. It is also essential to assess scientific quality and the impact of our activities on the Canadian Forces, the Department and Canadian industry.

III.1 Key Objectives

The following excerpt from the 1999/2000 Annual Report (Reference 8) illustrates how we measure and report Key Objectives.

1. **In partnership with the strategic planning element of the Department, to develop a Canadian position on the Revolution in Military Affairs.**

DRDB moved quickly on this initiative and completed it in 1999, as described in last year's Annual Report

2. **To have at least 10 S&T initiatives/products developed by the Branch adopted for implementation by the CF.**

Chapter 2 describes many such "products", ten of which are noted below

- *Canadian Infrared Ship Signature and Ship Engagement Model*
- *Feasibility of integrating a fuel cell power plant into a submarine*
- *FIXOR – replacement for C4 in landmine neutralization*
- *Soldier Information Requirements*
- *Electronic thermal neutron activation*
- *Pyrophoric decoy flares*
- *Heads-Up display for the Griffon helicopter night vision goggle*
- *AIM-9 missile shelf life extension*
- *Rapid Response Communications Package*
- *New deep diving table*

3. **To develop a Technology Investment Strategy that responds to the needs of the Department and the CF in 2020.**

Considerable progress on this objective was noted in last year's Annual Report The Technology Investment Strategy has been documented and published

4. **To initiate at least five new Technology Demonstration Projects**

The Branch has launched a Technology Demonstration Program (TDP) to demonstrate and validate technological solutions to CF operational requirements. The Program also gives our partners the opportunity to evaluate and display the utility of technology insertion Table 6 shows the projects in the TDP as of the end of fiscal year 1999/2000 Six of these got underway in 1999.

5. **To establish a business development strategy that maximizes the benefits of defence R&D. Targets for 1999/2000 are to leverage $26M from external partners and to generate $3M from external sources.**

In 1999/2000, we exceeded each of these targets by roughly $1 5M Chapter 6 provides some examples of collaborative arrangements with Canadian partners

III.2 Business Lines

As noted earlier, DRDC has four Business Lines:

(1) R&D for the CF and National Defence
(2) Strategic S&T Policy and Advice
(3) S&T with National Security Partners
(4) Corporate Management

Let us now consider how we can measure performance under these Business Lines.

(1) R&D for the CF and National Defence

Over the past five years, a system has evolved based on Service Level Agreements for each Client Group (CG). These are formulated annually and include about half a dozen Major Initiatives per CG, as well as detailed plans for each R&D Thrust, with resources, schedules, milestones and deliverables described down to project level. We use this framework to measure performance on Business Line 1. Our Annual Reports illustrate how this is done. For example, our 1999/2000 Annual Report (Reference 8) includes:

- Ten highlights for each CG (examples of major achievements).
- Progress made in meeting the Major Initiatives for each CG.
- Milestone achievement rate for each CG.
- Resource summaries by CG and Thrust.

We also allow for the possibility that noteworthy achievements may take place during the review period which were not forecast in the SLA. This could occur as a consequence of, for example: shifting priorities and resources within the CG's envelope in response to direction from the client; taking advantage of an unexpected opportunity or technological breakthrough; or faster progress than expected on one or more projects.

Client Satisfaction

For a government research organization such as DRDC, the primary method of obtaining feedback from clients in a systematic way is a Client Satisfaction Survey. In 1999, we conducted such a survey across all five Client Groups. We chose to contract-out this work in order to compile this information in a short time period, to elicit candid feedback from our clients and to guarantee confidentiality of responses.

A key element of this process is the application of a Client Satisfaction Questionnaire. In the 1999 survey, 75 clients were involved, with at least a dozen from each Client Group. These clients ranged in rank from Major to Brigadier General, and civilian equivalents. The questionnaire and interviews were administered under contract so as to assure an

arm's length, unbiased interpretation of data and information. The consultant's report (Reference 7) was distributed widely within our CF/DND client community. In addition, the Program Oversight Directorate performed an analysis of the data to extract indicators of the impact of the R&D Program in the following areas:

- DND/CF Decision Making
- CF Operational Capability
- Life Cycle Costs
- Benefits to Industry
- Program Formulation

The results of this analysis are given in Annex A of Reference 2. We intend to conduct a Client Satisfaction Survey of this nature every two years.

(2) Strategic S&T Policy and Advice

This Business Line is also organized on a Thrust basis, so performance may be measured in a somewhat analogous fashion to Business Line 1, i.e. highlights, major initiatives, milestone achievement and resource summaries. The above-noted Client Satisfaction Survey covers both Business Lines 1 and 2.

(3) S&T with National Security Partners

This Business Line encompasses similar activities to Business Line 1, but projects are undertaken primarily for clients outside DND, and the Agency receives income for these projects. Performance measurement may be done as suggested below.

- Set targets annually for DRDC as a whole and for each DRE.
- Track orders received, income earned and expenditures on marketing.
- For each project, track resource expenditure, milestones/deliverables and client satisfaction in an analogous manner to Business Line 1.
- Also track income from exploitation of Intellectual Property.
- Compare results to targets annually.

(4) Corporate Management

This Business Line includes a set of support functions: Central Administration and Services; Infrastructure Maintenance and Development; and Human Resource Services, including some services for DSs outside the Agency. It also includes the management overhead required for program management and control. For the support functions, we measure performance in an analogous manner to Business Line 1, i.e. using resource expenditure and milestones. Major organizational initiatives, such as Agency Implementation, are reported under this Business Line.

III.3 Scientific Quality

An S&T organization must maintain a high standard of scientific quality in order to deliver R&D products and advice that are valuable and credible. For the purposes of assessing scientific quality, our approach is to:

- Track indicators which are a reflection of the Agency's standing in the scientific community, such as open literature papers, scientific presentations at conferences, DRE technical documents, patents, reports of invention, license agreements, participation in national and international activities, scientific honours (including fellowships of learned societies) and awards.
- Conduct Peer Reviews of each Defence Technology Area periodically, probably every four years.

For the Peer Reviews, a technology framework is more meaningful than the Business Line framework. Our current set of Defence Technology Areas is shown below.

DREA
Undersea Warfare
Naval Platforms

DREO
Radar
Electronic Warfare

DCIEM
Human Factors

DREV
Weapons
Electro-Optics
Command & Control

DRES
CB Defence
Military Engineering

We also rely on two other government agencies for two Technology Areas: the Communications Research Centre for ***Defence Communications*** and the Institute of Aerospace Research for ***Air Vehicles***.

Note that six Peer Reviews have been conducted to date: Electro-Optics in 1996, CB Defence in 1997, Naval Platforms in 1997, Human Factors in 1998, Radar in 1999, and Command & Control in 2000. Reviews of Electronic Warfare and Undersea Warfare will take place later this fiscal year.

For our Peer Reviews, we have adopted key aspects of the Technical Assessment (TA) process used by the Defence Evaluation and Research Agency in the UK, which is described in some detail in Reference 9. The emphasis of TA is upon such factors as technical competence, technical quality and technical management. TA provides:

- a framework for analysing technical capabilities;
- an assessment of achievement and sustainability of technical excellence;
- a method for identifying areas for improvement;

- benchmarking against comparable R&D organizations.

The main component of this process is the Technical Assessment Questionnaire. It requires ratings against about 20 questions covering the following areas: technical strategy and plans, capabilities and technologies, team skills and competencies, customer focus and quality, knowledge management, reputation and product leadership, transfer of knowledge and technology from DRDC, and technical facilities.

During the past year we employed the Technical Assessment technique in peer reviews of Radar and Navigation Technology at DREO and Command and Control Technology at DREV. The technical team under review completed the questionnaire first (self-assessment). After the technical team's presentations had been completed, the peer review team completed the questionnaire and, in a debriefing of senior establishment management, compared its responses with those of the technical team.

We have found that this procedure provides three significant advantages. First, the process of self-assessment is extremely useful for the technical team members, providing them the opportunity to give their own program a critical evaluation in a structured manner. Second, the process ensures that the review addresses all questions of concern to management. Third, the peer review team's completed questionnaire, by itself, provides the "meat" of its report in a format which is immediately useful to both the technical team and DRDC management.

Note that DRDC has changed its technology framework from the above-noted 12 Defence Technology Areas to a set 21 R&D Activities. We must align our peer review process with these R&D Activities.

IV ANNUAL REPORT

In the context of performance measurement in DRDC, the Annual Report is by far the most important document. We have produced two such reports (References 2 and 8), and have learned much from this experience. It is useful to begin our discussion by looking at the Table of Contents for Reference 8.

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12. Scientific Awards and Honours

The following guidelines relate to the content of the above-noted chapters and tables.

Foreword

This is a one-page introduction to the report by ADM(S&T).

1. Branch Overview

This includes vision and mission statements, a brief description of DRDC and its Business Lines, and resource summaries.

2. Highlights

This chapter provides important examples of some major achievements arising from the R&D Programs that we conduct for our five Client Groups. We include ten highlights for each of the Client Groups, plus one corporate highlight – Agency Implementation.

3. Performance on Key Objectives

This chapter describes progress made on the Key Objectives that DRDB management set in 1998 and 1999.

4. R&D for the Canadian Forces and National Defence

This chapter reports on activities undertaken in support of Business Line 1. This includes progress made by the Client Groups in meeting their Major Initiatives. This chapter also includes a summary of milestone delivery, with such metrics as total number of milestones and milestone achievement rate per Client Group. A resource summary identifies resources by Client Group and Thrust. Client Satisfaction is discussed in terms of actions taken in response to the Client Satisfaction Survey conducted in 1999.

5. Strategic S&T Policy and Advice

This chapter reports on activities undertaken in support of Business Line 2.

6. S&T with National Security Partners

This chapter reports on activities undertaken in support of Business Line 3. It includes highlights and a table of examples of Revenue Generation Projects. Also, it reports on total income earned and leveraged from R&D projects undertaken for or in partnership with national partners. Other tables list Defence Industrial Research projects and examples of technology transfer (patents, reports of invention and licensing agreements).

7. Corporate Affairs

This chapter reports on activities undertaken in support of Business Line 4. It includes highlights and achievements under this Business Line.

8. International Collaboration

This chapter reports on international collaboration activities, including a table with examples of international activities and their relationship to the R&D Thrusts.

9. Excellence in Science

This chapter presents a number of metrics indicative of scientific output and achievement, such as numbers of open literature papers, scientific presentations at conferences, DRE technical documents, patents and reports of invention. Scientific awards are listed in a table. Peer reviews conducted during FY 99/00 are summarized.

10. Conclusion

This chapter includes concluding remarks and observations.

The schedule for producing the 99/00 Annual Report was as follows:

- DREs and HQ Directors designated POCs for the annual report by mid March.
- Data and information were submitted to DRDPO by mid May.
- DRDPO completed the first draft and submitted it to DREs and HQ Directors by mid June, with requests for missing/additional data and information.
- DRDPO completed the "final" draft report in mid July. It was submitted for translation at that time.
- The report was submitted to a consultant for layout and graphics in early August.
- Layout of the English text, with visuals, was completed by end August.
- The French translation was completed at the end of October.
- Layout with the French text was completed by mid November.
- Printing occurred by the end of November.

In this chain of events, it is evident that French translation took far too long. In the future, precautions must be taken to avoid such a delay.

V QUARTERLY REPORTS

Thus far, we have provided considerable detail on the metrics and qualitative information that will be captured annually and incorporated into the Annual Report. We have said little about metrics and reports that could be used to support management as the fiscal year unfolds.

Of course, financial metrics will continue to be of paramount importance. Budgets, income (Business Line 3) and expenditures must be monitored and projected.

As to other metrics, it is useful to observe that in DERA the most critical metrics are profit, milestone delivery and staff utilization (Reference9). For us also, financial metrics (our analogy of profit) are vital, as we have just noted. What about DERA's two other critical metrics?

Milestone delivery is a simple but meaningful output metric. It indicates to management how well the Agency is delivering relative to what was promised to clients. It lends itself well to target setting and tracking.

In our context, staff utilization is defined as the number of hours devoted directly to projects undertaken for clients (i.e. under Business Lines 1, 2 and 3) divided by the total number of staff hours in the organization. Note that utilization hours do not include vacation leave, sick time, training or any other staff duties or overhead that cannot be charged directly to a project. The utilization metric shows management to what extent staff are deployed on client-funded projects. It is a simple, useful indicator of how efficiently the organization is deploying its resources. It is needed to set charge-out rates. It also lends itself well to target setting and tracking.

To get utilization data, the Agency must implement a system for staff to record their usage of time on a regular basis, say weekly. We can draw ample guidance from our defence research colleagues in other nations (who have been doing this for years), as well as from the National Research Council in Canada.

Progress on Key Objectives and Client Group Major Initiatives will also require in-year measurement and reporting. Obviously, management must monitor progress on these to ascertain whether the Agency is on course to meet its targets, and if not, to trigger remedial action.

We propose to proceed with in-year performance measurement and reporting as follows.

- *Monthly report on key financial metrics* (i.e. current practice).
- *Status report on Key Objectives, Client Group Major Initiatives, and milestone delivery at the end of the second, third and fourth quarters of the fiscal year. Add staff utilization when the data are available.*

VI ANNUAL BUSINESS CYCLE

It is useful to note how Performance Measurement fits into the Annual Business Cycle. DRDC's Annual Business Cycle Calendar, which was developed earlier this year by DSTM, DRDRA and the Executive Assistant to ADM(S&T), is at Annex B. It lists key corporate activities under six headings:

- Business Planning
- Corporate Alignment
- Human Resources
- Performance Measurement
- Program Management
- ADM(S&T)

Note that under Performance Measurement, two activities are included for which DRDPO is not responsible, namely: Program Reviews at the DREs and S&T Report to STATCAN.

VII LINKAGE TO PERFORMANCE MEASUREMENT IN DND

As noted in the Introduction, DND has made progress in outlining its framework and requirements for performance measurement. At Annex C is a table setting out the measures and indicators proposed for DND for FY 2000/2001. They are grouped into five Key Perspectives:

- Operational Forces
- Defence Team
- Leadership, Professionalism and Values
- Contribution to Government of Canada
- Resource Management

Note that the eight DND Change Objectives discussed in Section II.2 appear under "Change Management" in the Resource Management Key Perspective. One could readily question whether this is the right place for them, but wee must recognize that it is still "early days" for performance measurement in DND.

Reproduced below is ADM(S&T)'s response to DND's proposal. It shows how our oversight process meshes with DND's.

For several years, it has been our practice in Defence R&D to set high level objectives for the organization and to publish them in our annual publication called *"Looking Forward Staying Ahead"*. In 1999, we set the following Key Objectives for 2000/2001.

1. To work towards doubling, by 2002, our investment in four growth areas identified by the Technology Investment Strategy and aligned with defence Strategy 2020
2. In partnership with other elements of DND, to develop a Departmental approach to the use of Modelling and Simulation for testing and evaluating new concepts and systems
3. To have at least 10 S&T initiatives/products developed by the Branch ready for implementation by the CF.
4. To initiate five new collaborative R&D projects with the US.
5. To establish a Technology Outreach Program with Canadian universities by sponsoring two more University Chairs in new technology areas
6. To initiate at least five new Technology Demonstration Projects.
7. To license five technology concepts to industry for further development.
8. To work towards targets of leveraging $30M from national partners and $40M from international allies, and generating $10M in revenue from external sources by 2004.

We would like to work these Key Objectives into the DND Performance Measurement Framework. This could be done as follows:

- Key Objectives 1 and 2 under Change Objective #3 in Resource Management
- Key Objectives 4, 6 and 8 under Change Objective #7 in Resource Management.
- Key Objective 3 under Modernization in Operational Forces
- Key Objectives 5 and 7 under Domestic Obligations in Contribution to Government of Canada.

In addition, we could report our success rate in milestone delivery in the R&D Programs that we undertake for our five major Client Groups. This could go under Project Management Effectiveness in Resource Management.

Finally, we suggest that under Strategic Investment in Resource Management, % R&D spending of DSP be reported annually, not semi-annually.

For convenience, we have noted these suggestions by hand on the attached copy of the DND Performance Measurement Framework.

VIII IMPACT OF OVERSIGHT REQUIREMENTS ON DRDC

With the development of the Collaborative Planning and Management Environment, DRDPO staff should be able to produce quarterly reports fairly independently, i.e. with minimal disturbance to the rest of DRDC. However, the Annual Report will require some effort from both the DREs and DRDC HQ, as discussed below in the context of the 1999/00 Annual Report. Peer reviews also require appreciable effort from the DREs concerned. Note that for the Annual Report the demands placed on other DRDC HQ directorates and on the DREs are intentionally modest. The principle that we have tried to follow is to ask for only such data and information as should be on hand anyway for the purposes of sound, accountable, results-oriented management.

The Program Oversight team is responsible for drafting the report, drawing on data and information supplied by the DREs and HQ Directorates. The following lists show the data/information required from each of these responsibility centres.

DRE's

- Number of open literature papers
- Number of conference presentations
- Number of DRE publications
- Number of Contractor reports
- List of Patents and Reports of Inventions filed
- List of License Agreements
- Examples of revenue generation projects
- Number of National Activities
- Number of International Activities
- List of Scientific Honours and Awards, including list of Fellows of learned societies
- Number of NATO fellowships
- Number of NSERC fellowships
- Administrative and Infrastructure highlights under Business Line 4
- Photographs suitable for insertion into the report (maximum of 5)

DSTM, DSTL, DSTA, DSTCCIS, DSTHP

- 10 achievements or program highlights for FY 1999/2000 for each Client Group. Achievements should be limited to a paragraph or two and state the impact it has had on the CF or DND. (In practice, DSTs extract these highlights from the Service Level Agreement being prepared in the late winter time frame.)
- A progress report on each of the Major Initiatives, identified in their respective 1999/2000 SLA's. This should identify whether the initiative has been achieved or not, or to what degree.
- For each Thrust, a list of milestones due in 99/00, as identified in the 99/00 SLA. For each milestone indicate whether or not it has been completed, or to what degree (i.e. percentage completion).
- Overall milestone delivery within the thrust, namely: number of milestones undertaken and number of milestones achieved.

- Number of FTE's by Thrust.
- Number of National Activities of DST staff
- Number of International Activities of DST staff
- List of Scientific Honours and Awards, including list of Fellows of learned societies, conferred on DST staff
- Photographs suitable for insertion into the report (maximum of 5 per Client Group)

DST Pol

- Highlights and achievements under Business Line 2
- Comments on significant strategic planning achievements
- Comments on international collaboration, including resources leveraged
- Number of National Activities of DST Pol staff
- Number of International Activities of DST Pol staff
- List of Scientific Honours and Awards, including list of Fellows of learned societies, conferred on DST Pol staff

DBDO

- Highlights and achievements under Business Line 3
- Number of projects undertaken under Business Line 3, and number of projects completed
- Resources earned and resources leveraged from R&D projects undertaken under Business Line 3
- Success stories of the DIR Program in 99/00
- List of active DIR Projects in 99/00 and resources expended
- Number of National Activities of DBDO staff
- Number of International Activities of DBDO staff
- List of Scientific Honours and Awards, including list of Fellows of learned societies, conferred on DBDO staff

DRDHR

- Information on HR services, including significant achievements, objectives undertaken and degree of success
- Employee statistics (number of DSs, other S&T professionals, technologists, administrative staff), number of staff hired and departed

DRDRA

- Corporate administrative and infrastructure highlights under Business Line 4
- FTE's by DRE and occupational category and level
- Resources by fund types, which were allocated and expended by Client Group and Thrust.

DRDCIM

- Corporate communications and IM/IT highlights under Business Line 4

DRDPO

- Overall responsibility for data gathering, coordination, drafting and quality control of the Annual Report
- Section on Client Satisfaction Survey
- Segments related to Peer Reviews
- Tracking and reporting of Key Objectives
- Roll-up of data/information on Major Initiatives under Business Line 1
- Roll-up of data/information on Milestones under Business Line 1

IX CONCLUSION

This paper has set out DRDC's performance measurement framework and has described in some detail how the Agency's performance is currently measured and reported. It should provide useful guidance for program oversight in DRDC for the next several years.

Even though DRDC has reason to be pleased with the program oversight system which has been developed and implemented over the past two years, there is naturally scope for enhancement. Three examples that come readily to mind are:

- Periodic validation of milestone delivery statistics by DRDPO staff
- Client satisfaction surveys at the project level
- Alignment of our peer review process with DRDC's 21 R&D Activities.

REFERENCES

1. *"Program Oversight for the Defence Research and Development Branch – Concepts for a Managerial Framework and a Performance Measurement System"*, DRDPO Paper, May 1999.

2. *"Defence Research and Development Branch Annual Report 1998/1999"*, Defence Research and Development Branch, November 1999.

3. *"Defence R&D Canada Framework Document"*, approved by Treasury Board Ministers 27 July 2000.

4. *"Looking Forward Staying Ahead into the Next Century"*, Defence Research and Development Branch, September 1999.

5. *"Defence Strategy 2020"*, Department of National Defence, September 1999.

6. *"Technology Investment Strategy for the Next Two Decades"*, Defence R&D Canada, June 2000.

7. *"Report on a Client Satisfaction Survey Conducted on Behalf of the Defence Research and Development Branch"*, AeroVations Associates, August 1999.

8. *"Defence Research and Development Annual Report 1999/2000"*, Defence R&D Canada, September 2000.

9. *"Performance Measurement in the Defence Evaluation and Research Agency - Summary of Information Obtained under a Consultation Contract"*, 1630-1(DRDPO), 8 April 1999.

ANNEX A

PROGRAM ELEMENTS

The R&D program consists of a number of elements, including: Technology Investigation (TI) and Technology Application (TA) activities, the Technology Demonstration Program (TDP), the Technology Investment Fund (TIF), the Defence Industrial Research (DIR) Program, the DND/NSERC* Research Program and the Defence Communications Program.

*NSERC stands for the Natural Sciences and Engineering Research Council.

Technology Investigation and Technology Application
R&D with a longer time line, because it is earlier in the R&D process, is labelled Technology Investigation, while that responding to an immediate requirement is labelled Technology Application. Almost all these activities are conducted by the DREs through in-house and contracted-out R&D. New TI and TA projects are initiated by the Thrust Advisory Groups and staffed through the annual program formulation process, culminating in an approved Service Level Agreement.

Technology Demonstration Program
The objective of the TDP is to demonstrate technologies fostered by DRDC and Canadian industry in the context of real and potential future CF capabilities, concepts, doctrine, operations, and equipment. The TDP is aimed at concept development and evaluation for force design purposes and is therefore typically not focused uniquely on hardware development. TDP projects are typically 3 to 4 years in duration and have an average "cash" value of $5M. The nominal annual "cash" value of the TDP is $30M. In-kind or cash contributions of the DREs, CF, and industrial or international partners will increase the total value of the project by 50% to 100%. The projects are necessarily fast paced to ensure relevance of the program results and access to state-of-the-art concepts for operational deployment.

Technology Investment Fund
The Technology Investment Fund was established exclusively for the funding of forward-looking, high-risk, but potentially high-payoff, research projects that are consistent with the defence technology investment strategy. The nominal annual "cash" value of the TIF program is $6M. In steady-state operation, approximately one-third of TIF funds will be available for new starts each year. Individual TIF projects will typically not exceed three years in duration and $1M in contracting funds. TIF projects are initiated by individual scientists in the DREs and staffed through the DRE management to the Agency's Technology Assessment Working Group for recommendation to the R&D Executive Committee for approval.

Defence Industrial Research Program
The DIR Program is a cost-sharing industrial program approved by Treasury Board to promote and improve the research and technological capabilities of Canadian defence

industry in order to strengthen the defence industrial base. Under this program, defence R&D activities are funded jointly (usually 50/50) by DRDC and Canadian industry. The DIR program is approved to a nominal annual funding level of $4M. DIR Projects are initiated by industry and are staffed through and approved by the Defence Industrial Research Advisory Committee. The projects require formal sponsorship by both the CF and the Agency.

DND/NSERC Research Program

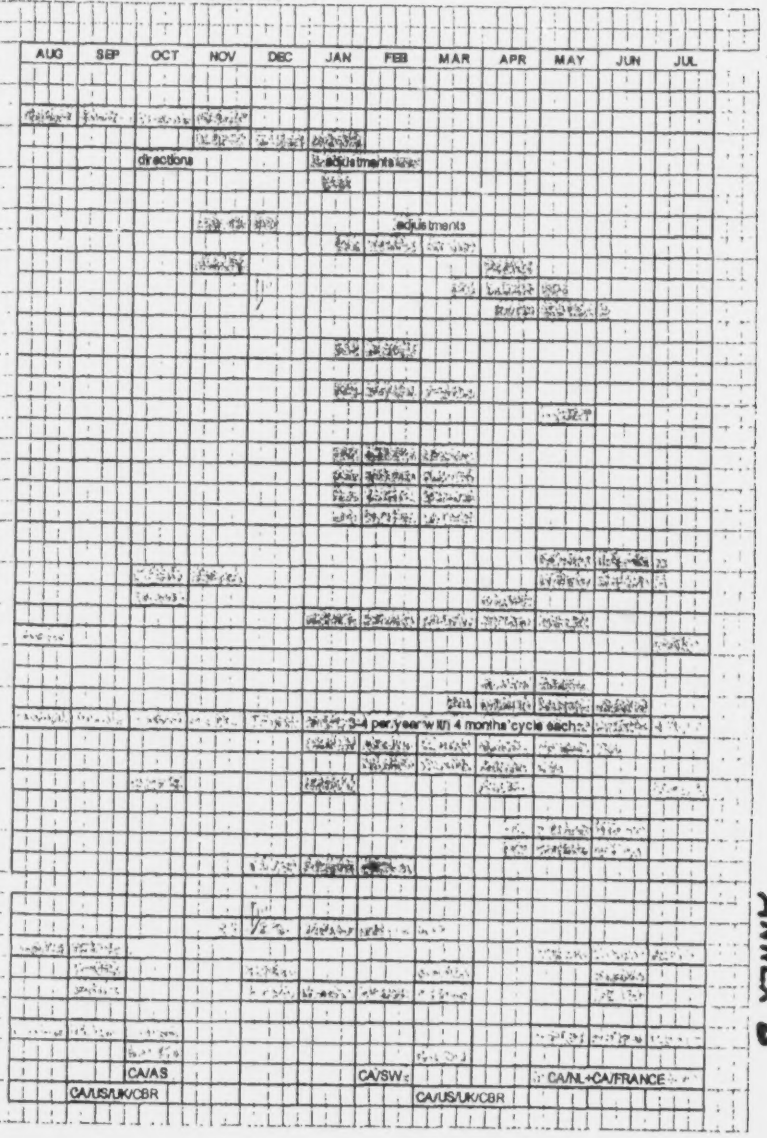
The DND/NSERC Research Program is a jointly managed and jointly funded program which supports university-based research, research training and research-related activities carried out on both a bilateral (DND/university) and multilateral (DND-university-industry) collaborative basis. Preference is given to the latter.

Defence Communications Program

The Agency conducts its program of R&D in communications through an annual allocation of about $3M to the Communications Research Centre.

ANNUAL BUSINESS CYCLE CALENDAR

THEME		LEAD	KEY MGT PLAYER	SUPPORT ORG
BUSINESS PLANNING				
	Level 1 BP (including BL4 elements)	DGRDBA	DRDRA	DRDRA, DST Pol
	Input to DPG			
	Ref. Levels (All BLs)	RDEC	DGRDP, DGRDBA	DRDRA
	Update CRME project dictionary	RDEC	DSTs, A/DGRDP, SPO, DBDO, DGs	
BL 1				
	Preparation of Thrust Plans	SAs, DSTs	TLs/TCs	
	Prep. of SLAs (Level 2 BPs)	SAs + DGRDP	DSTs	DRDRA
	RDOG Meetings	SAs	DSTs	
	LFSA	DST Pol	DST Pol	DSTs
	RDPB	DGRDBA/DGRDP	DGRDP	DRDRA, DST Pol
BL 2				
	Thrust Plans	DGRDP	DST Pol, A/DGRDP, SPO	
BL 3				
	Bus Dev/Marketing Plan	DGs	DBDO	Lab BDOs ff.
	CDIA DRDC/TDP Day			
BL 4				
	HR Plan (Level 2 BP)	RDEC, DGRDBA	DGs, HR Advisors	DRDHR
	IE Plan (Level 2 BP)	RDEC, DGRDBA	DGs	DRDIE
	Comms Plan (Level 2 BP)	RDEC, DGRDBA	DGs	DRD Comms
	IM/IT Plan (Level 2 BP)	RDEC, DGRDBA	DGs	DRDKIM
Corporate Alignment				
	RDEC Strategic Retreat	CEO	EA/ADM S&T	DGRDP/DGRDBA
	DRDC Advisory Board	CEO	DST POL	
	Network of S&T Partners	ADM(S&T)	DST Pol	
	Federal S&T Report	DST Pol	DST Pol	
	DSAB	DST Pol	DST Pol	
Performance Measurement				
	DREs Program Review	DG/DREs	DG/DREs	DRDPO
	Annual Report	DRDPO	DRDPO	DREs + HQ
	Peer Review	DRDPO	DRDPO-2	DREs
	Satisfaction Surveys	DRDPO	DRDPO-2	DST
	S&T Report to STATCAN	DGRDBA	DRDRA	DST POL / DBDO
	Quarterly Report	DRDPO	DRDPO-3	
HR				
	PERs Employees (except MI & DS)	DRDHR	HQ + DREs	
	PERs MI	A/DGRDP	DGs	DRDHR
	PERs DS	DGs/DREs+DGRDP	DGs/DREs+DGRDP	DRDHR
Program Management				
	TDP	DGRDP	DSTs/TLs-TCs	
	TF	DGRDP	TAWG	DST Pol
	DRAC	DGRDP	DBDO-4	DRDRA
	Cyclical Forecast	DGRDBA	DGs, DSTs	DRDRA
ADM(S&T)				
	International TTCP	Washington Staff	CDRD-CD-S(W)	DST Pol
	International NATO RTO	DST Pol	DST Pol	
	International Bilaterals	DST Pol	DST Pol-5	DREs + HQs
	International Trilaterals	DST Pol/DGs	DST Pol-5	



ANNEX B

ANNEX C

DND PERFORMANCE MEASURES AND INDICATORS

DRAFT

Proposed Measures and Indicators for FY 2000/2001

Key Perspective	Focus Area		Measures	Indicators	Recommended Reporting Frequency	OPI (contact)
Operational Forces	Force Ability	O1	Readiness	**Army** - % effective personnel against establishment - % personnel against Operational (specific) Plans - % major fighting equip held/serviceable against Op Plan TO&E - % major logistics equip held/serviceable against establishment - % personnel completing level 1 training - % personnel completing collective training levels 3, 4, 5 within last 6 months	Annually Annually Semi-annually Semi-annually Semi-annually Semi-annually	CLS
				Navy - *High readiness ship rotational policy being developed* - Combat readiness (R&S policy) - Personnel readiness (R&S policy) - Material readiness (R&S policy) -	Semi-annually	CMS
				Air Force - TBD	Semi-annually	CAS
		O2	Tempo Management	**Army, Navy, Air Force** - % personnel redeployed within the 12 month at home requirement (TBD) (note – this addresses the number of waivers granted)	Annually	ECSs

	Modernization	O3	Equipment Modernization (status of major capital equipment by Environment)	- Major Equipage/ELE life cycle status - Equipment suitability index (in development) - S&T initiatives/products ready for implementation	Annually Annually Annually	CMS CLS CAS ADM(S&T) KO 3
	Interoperability	O4	Interoperability with selected allies	- Equipment interoperability (STANAGS) - Joint exercises (number planned, conducted, post ex reports - C2 connectivity (in development with ADM(IM))		
	Effectiveness	O5	Lesson Learned	- Number of LL recommendations (by area/type) - number of LL recommendations accepted and actioned - assessment by force employer against mission objectives	Annually Annually	CMS CLS CAS DCDS
Defence Team	Workforce (Personnel) Production Requirements	D1	Turnover/attrition of critical classifications/ trades/MOCs	- % filled vs unfilled positions on REMAR/AER - Attrition rates (projected/actual) - Mean length of time to fill all positions (esp critical skill jobs (mil/civ)	Semi-annually	ADM (HR Mil) & ADM(Hr Civ)
		D2	Recruitment and Retention levels	- % of recruiting targets attained (planned intake vs actual) - Projected Force age-profile by MOC - Conversion of Terms of Service rates (cross reference by MOC and rates of Pay)	Semi annually Annually Semi-annually	ADM (HR Mil)
		D3	Quality of Recruitment	- % of recruits that hold a secondary school graduation diploma - % of non-RMC OTCP candidates who possess an undergraduate degree	Semi annually Semi annually	ADM(HR Mil)
		D4	Training Productivity	- Individual recruit training productivity- % of recruits who qualify in their occupational training of total intake - Professional Development (TBD) - Education level of personnel in comparison to Cdn population and other militaries (if existant) - (university level, CFATs)	Annually	ADM (HR Mil)
	Quality of Life	D5	Member/employee QOL satisfaction	- statistical sampling of organisational support index from D2000 and other survey results (balance work and family life, concern for well-being) - "Mechanisms of Voice" volume and issue trends in 1-800 traffic (in development)	Biennially Annually	ADM (HR Mil)/ (OCI VCDS) ADM(HR Mil)

	Work Environment	D6	Organizational Health	- Number of grievances received (by type) - trend of harassment complaints per 100 members (in comparison to OGDs) - Court Martial Trends	Annually Annually Annually	All Level 1's All level 1's JAG
		D7	Personnel Health	- % establishment fit to deploy (trend of medical & physical fitness) - trend of suicides as % per 1000 regular force strength - EAP traffic trends (by type)	Annually Annually Annually Semi-annually	ADM(HR Mil) CMS, CLS, CAS
		D8	Safety, Injury and mortality rates	- Trend of no of CF/DND members injured per 100 (injury and severity rates) - Mortality rates of CF/DND members per100	Semi-annually	ADM(HR Mil) & VCDS
Leadership, Professionalism and Values	Strong Leadership Standards	L1	Status of definition of strong leadership standards for military	- Perceptions of leadership from D2000/other surveys	Biennially (TBD)	ADM(HR Mil) ADM(HR Civ) & VCDS
	Leadership Development	L2	Leadership Development (Mil/Civ)	TB Developed		
	Professionalism and Values	L3	Ethics	Survey analysis assessing behaviour and performance (TBD)		
Contribution to Government of Canada (GOC)	Coherent Advice and Value-added Reporting	G1	Advice to Government	- Assessment of the quality of advice to stakeholders by those who have received it - Assessment of preparation of MND	Annually	ADM (Pol)
	Contributions to GOC Priorities and Programs	G2	Meeting Government Programs	- Performance vs commitment re environmental stewardship, nuclear safety, employment equity, multiculturalism, ATIP, - % of agreed upon external audit and review recommendations implemented	Annually Annually	Functional ADMs CRS
	Service provided to OGDs	G3	Providing services to OGDs (e g DFO, RCMP)	- Assessment of feedback from OGDs - Performance against MOU's	Annually	ECSs/ADM(Pol)
	International Obligations	G4	International Obligations Met	- Multilateral, allies feedback on international operations role/effectiveness, interoperability compared to mission objective Lessons learned assessment	Annually	DGSP/ADM (Pol)
	Domestic Obligations	G5	Domestic Obligations	- Industrial partnerships (ADM Mat/ADM S&T) * - Academic Linkages (ADM (S&T), ADM (Pol)) ** - Assessment of performance of domestic operations (SAR, disaster Relief, Humanitarian assistance etc)		
	Public Understanding of National Defence and its Contribution	G6	Public awareness and understanding of DND contribution and relevance	- Trends of Canadian's awareness of CF (as per pollara questions)	Semi-annually	DGPA

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* Include leveraging & tech transfer / licensing KO 7

Resource Management	Resource Planning and Allocation	R1	Effective planning of resources in current year	- % DSP reallocated quarterly - % DSP under expended in current year and $ carried forward	Quarterly	ADM (Fin CS)
		R2	Strategic Investment (Capital and infrastructure)	- % Budget expended on Capital - % R&D spending of DSP - Budget components of combat units - Capital equipment requirements compared to current available funding	Semi-annually Semi-annually Annually Annually	ADM (Fin CS)/ ADM(S&T) ADM (Fin CS) ADM (Fin CS)
	Resource Management	R3	Project Management Effectiveness	- % Strategic Capital Projects meeting criteria as per PMBOK components (schedule, budget, performance risk or earned value) - % Milestones in R&D Program	Annually Annually	ADM(Mat) ADM(S&T)
		R4	Material/Logistic Support	- Average elapsed time from Preliminary Project approval to Initial Operational Capability, in months, for MCPs in development during a given calendar year(whereby assessing the number of projects achieving a 30% reduction in acquisition time from baseline FY 1999) – (TBD) - % National Purchase supply requests unfilled vs demand (specific reporting items being developed)	Semi-annually	ADM (Mat)
		R5	Infrastructure	- Infrastructure condition index - Infrastructure suitability index - Infrastructure Compliance index - Statutory safety code index - Plant Replacement Value index	Semi annually	ADM (IE) (work ongoing)
	Change Management	R6	Progress towards Strategy 2020 Change Objectives	- % of achievement of assigned change goals Change Objectives 3 & 7 have S&T components	Annually	All L1s

Key Objectives 1 & 2 under Change Objective 3
" " 4, 6 & 8 " " " 7